

Remarks/Arguments:

I. Status of the Application

Claims 6-11, 13 and 21-28 were pending in this application prior to this Amendment. In the October 9, 2007 office action, the Examiner:

A. Objected to the amendments filed on 6/27/2005, 1/17/2007 and 6/16/2006 as introducing new matter;

B. Rejected claims 6-9, 11, 22 and 25-28 under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement;

C. Rejected claims 6 and 21 under 35 U.S.C. § 102(b), as allegedly being anticipated by U.S. Patent No. 5,985,045 to Kobayashi (hereinafter “Kobayashi”);

D. Rejected claims 22-24 and 25-28 under 35 U.S.C. § 103(a), as allegedly being obvious over Kobayashi in view of U.S. Patent No. 5,733,177 to Tsuchiya et al. (hereinafter “Tsuchiya”);

E. Rejected claim 8 under 35 U.S.C. § 103(a) as allegedly being obvious over Kobayashi in view of Tsuchiya in further view of U.S. Patent No. 5,780,358 to Zhou (hereinafter “Zhou”); and

F. Determined that claim 13 included allowable subject matter.

In this response, claims 6, 22 and 25-28 have been amended and claims 29-33 have been added. The Applicant respectfully requests reconsideration of the claims in view of the foregoing amendments and accompanying remarks.

II. The Objections to the Specification

The Examiner objected to the specification because of amendments made in June, 2005. So as to avoid further delay, the Applicant has amended the claims to recite language in the specification as originally filed. Specifically, claims 22 and 25-28, as amended, recite “decreasing the force” instead of “reducing the pressure.” The phrase “decrease the force” is found in the Applicant’s specification at page 12, lines 17-20.

Therefore, because the elements set forth in the claims are fully supported by the Applicant’s specification, the Applicant respectfully submits that the rejection of the specification has been overcome.

III. The Indefiniteness Rejection of Claims 6-9, 11, 22 and 25-28

The Examiner rejected claims 6-9, 11, 22 and 25-28 alleging that the “reducing” limitation discussed above was not supported by the specification. As discussed above, the “reducing” limitation has been replaced with language from the originally filed application. Accordingly, the Applicant respectfully submits that the rejection of claims 6-9, 11, 22 and 25-28 under 35 U.S.C. 112, first paragraph has been overcome.

IV. Claims 6 and 21 Are Not Anticipated

The Examiner has rejected claims 6 and 21 as allegedly being anticipated by Kobayashi. Kobayashi does not disclose each element of the claims.

Discussion Re: Patentability of Claim 21

1. Claim 21

Claim 21 recites:

A method of fabricating a semiconductor wafer, comprising:

- (a) mixing an aqueous slurry containing an abrasive material and a nonaqueous solvent in a mixing unit so as to create a first volume of an aqueous slurry/nonaqueous solvent mixture with a first weight % of said nonaqueous solvent prior to being disposed onto said semiconductor wafer;
- (b) disposing said first volume of the aqueous slurry/nonaqueous solvent mixture containing an abrasive material onto said semiconductor wafer;
- (c) polishing the semiconductor wafer with a polishing pad using said first volume;
- (d) mixing said aqueous slurry containing an abrasive material and said nonaqueous solvent so as to create a second volume of an aqueous slurry/nonaqueous solvent mixture having a greater weight % of said nonaqueous solvent than said first weight % prior to being disposed onto said semiconductor wafer;
- (e) disposing said second volume of said aqueous slurry/nonaqueous solvent mixture containing an abrasive material onto said semiconductor wafer; and
- (f) polishing said semiconductor wafer using said second volume.

Therefore, claim 21 requires that the *same* aqueous slurry containing an abrasive material is used to polish a single semiconductor wafer a first time and a second time, the difference being that for the second polishing, the weight % of the aqueous slurry containing an abrasive material is decreased. Thus, the amounts of two components of a slurry are varied for polishing a *single* wafer.

2. Kobayashi Has Been Mischaracterized

The Examiner has rejected claim 21 based upon the disclosure of Kobayashi. (Office Action at page 5). Specifically, the Examiner has noted that “Kobayashi teaches any dilution ratio may be used” citing to Kobayashi at column 5, lines 34-35. (Office Action at page 5). The Examiner then alleges that the teaching of Kobayashi discloses the use of two different mixes of aqueous slurries on a single wafer. (Office Action at page 5). Respectfully, to the extent the Examiner’s argument can be understood, the Examiner has mischaracterized Kobayashi.

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The Examiner has apparently determined that Kobayashi does not expressly disclose the use of two different mixes of aqueous slurries on a single wafer, since no such disclosure is identified. Accordingly, for the Examiner’s conclusion to be true, Kobayashi’s teaching of how to make different mixes of aqueous solution must *necessarily* result in the use of two different mixes of aqueous slurries on a single wafer. This proposition cannot be supported. For example, FIG. 1 of Kobayashi shows a system with a *single* mixer 123. Thus, a *single* polishing mixture is deposited on a wafer. (See, e.g., Kobayashi at column 3, lines 50-61).

Thus, while Kobayashi teaches that “[v]irtually any dilution ratio may be achieved” (Kobayashi at column 5, lines 33-35), the ability to use multiple stages of the mixer of Kobayashi to achieve a desired dilution does not require that dilutions other than the desired dilution be used on the wafer. Accordingly, the use of two different mixes of aqueous slurries on a single wafer is not inherent to the disclosure of Kobayashi.

Therefore, because Kobayashi does not expressly teach the use of two different slurries on a a single wafer, and because the ability to stage the mixers of Kobayashi to achieve a desired dilution does not inherently require that more than one dilution be used on a single wafer, Kobayashi does not describe, either expressly or inherently, the use of two different mixes of aqueous slurries on a single wafer as recited in claim 21.

Anticipation under 35 U.S.C. § 102 is proper only if the prior art reference discloses each and every element of the claim. Since the Kobayashi does not disclose

“disposing said second volume of said aqueous slurry/nonaqueous solvent mixture containing an abrasive material onto said semiconductor wafer” (emphasis added) and “polishing said semiconductor wafer using said second volume,” (emphasis added) Kobayashi does not anticipate claim 21.

3. Conclusion

For any or all of the foregoing reasons, it is respectfully submitted that the rejection of claim 23 as anticipated by Kobayashi has been successfully traversed, and the Applicant respectfully submits that the rejection of claim 23 should be withdrawn.

Discussion Re: Patentability of Claim 6

1. Claim 6

Claim 6 recites:

The method of claim 23, wherein:
said weight % of said nonaqueous solvent in said aqueous slurry/nonaqueous solvent mixture is gradually increased from the weight % of the first volume until said aqueous slurry/nonaqueous solvent mixture is substantially free of said aqueous slurry during said polishing.

Claim 6 thus depends from claim 21 by way of claim 23. Claim 23 recites “disposing said second volume of aqueous slurry/nonaqueous solvent mixture during said polishing of said semiconductor wafer.” Accordingly, claim 6 requires a second mixture to be deposited on a wafer while the wafer is being polished and that the weight % of the nonaqueous solvent be gradually increased during the polishing of the wafer.

2. Anticipation has Not Been Properly Alleged

As an initial matter, the Examiner has failed to provide a complete rejection.

37 CFR 1.104 requires that:

In rejecting claims for want of novelty or for obviousness, the examiner must cite the best references at his or her command. When a reference is complex or shows or describes inventions other than that claimed by the applicant, *the particular part relied on must be designated as nearly as practicable*. The pertinence of each reference, if not apparent, must be clearly explained and each rejected claim specified.

(Emphasis added).

As noted above, claim 6 depends from claim 21 by way of claim 23. The Examiner has failed to identify any disclosure in Kobayashi of the limitations of claim 23.

Anticipation under 35 U.S.C. § 102 is proper only if the prior art reference discloses each and every element of the claim. Since the Examiner has failed to identify each and every element of Applicant's claim 6 in Kobayashi, Kobayashi does not anticipate claim 6.

3. The Argument of Claim 21 Applies

Moreover, claim 6 depends from claim 21 and includes all of the limitations of claim 21. As discussed above, claim 21 is not anticipated by Kobayashi. Accordingly, for at least the same reasons set forth above with respect to claim 21, claim 6 is patentable over Kobayashi.

4. Kobayashi Does Not Disclose Gradual Increase

Additionally, claim 6 has been emended to recite that the weight % of the nonaqueous solution is "gradually increased" during the polishing of a wafer as disclosed

at page 14, lines 8-16 of the Applicant's specification. Kobayashi does not disclose this limitation.

5. Conclusion

For any or all of the foregoing reasons, it is respectfully submitted that the rejection of claim 6 as anticipated by Kobayashi has been successfully traversed, and the Applicant respectfully submits that the rejection of claim 6 should be withdrawn.

V. Claims 22-28 Are Not Obvious

The Examiner has rejected claims 22-24 and 25-28 as allegedly being obvious over Kobayashi in view of Tsuchiya. The claims are not obvious in view of the cited art.

Discussion Regarding the Patentability of Claims 22-24

1. The Argument of Claim 21 Applies

Claims 22-24 have been rejected based primarily upon Kobayashi with additional reference to Tsuchiya, apparently for the limitations added by the claims 22-24. Each of claims 22-24 depend from claim 21 and include additional limitations. Accordingly, even if Kobayashi is modified in some manner by the teaching of Tsuchiya to include the limitations added by claims 22-24, such modification would not correct the deficiencies of Kobayashi identified above with respect to claim 21. Accordingly the proposed modification does not arrive at the invention of claims 22-24 and claims 22-24 are patentable over the combination of Kobayashi and Tsuchiya.

2. Obviousness has Not Been Properly Alleged

Moreover, the Examiner has failed to properly allege *prima facie* obviousness. 37

CFR 1.104 requires that:

In rejecting claims for want of novelty or for obviousness, the examiner must cite the best references at his or her command. When a reference is complex or shows or describes inventions other than that claimed by the applicant, *the particular part relied on must be designated as nearly as practicable*. The pertinence of each reference, if not apparent, must be clearly explained and each rejected claim specified.

(Emphasis added).

The Examiner has failed to identify any disclosure in Tsuchiya of the limitations of claims 22-24.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Since the Examiner has failed to identify each element of Applicant's claims 22-24 in Tsuchiya, *prima facie* obviousness has not been properly alleged and the rejection of claims 22-24 should be withdrawn.

3. Conclusion

For any or all of the foregoing reasons, it is respectfully submitted that the rejection of claims 22-24 as obvious has been successfully traversed, and the Applicant respectfully submits that the rejection of claims 22-24 should be withdrawn.

*Discussion Regarding the Patentability of Claim 25*1. Claim 25

Claim 25 recites:

A method of fabricating a semiconductor wafer, comprising:

(a) disposing a volume of an aqueous slurry containing an abrasive material onto a semiconductor wafer and polishing the semiconductor wafer with a polishing pad, said polishing pad in contact with said semiconductor wafer when said volume of aqueous slurry is disposed onto said semiconductor wafer;

(b) disposing a volume of nonaqueous liquid including a nonaqueous solvent onto said semiconductor wafer to rinse the semiconductor wafer; and

(c) facilitating the advancement of the nonaqueous liquid into contact with the semiconductor wafer by decreasing the force applied to said polishing pad or said semiconductor wafer prior to completing disposing the volume of nonaqueous liquid including the nonaqueous solvent onto said semiconductor wafer.

Therefore, claim 25 includes a step of bringing nonaqueous liquid into contact with a semiconductor wafer by decreasing the force applied to a polishing pad or a semiconductor wafer.

2. The Combination Fails to Arrive at the Claimed Invention

The Examiner has admitted that Kobayashi fails to teach reducing pressure but relied upon Tsuchiya for describing that step. (Office Action at page 7). Claim 25 has been amended to clarify that the decrease in force is performed as part of a step for bringing a nonaqueous liquid into contact with the semiconductor wafer. Tsuchiya does not disclose a process with this limitation.

Specifically, the Examiner identified claim 8 of Tsuchiya as teaching the reduction of pressure between the polishing pad and a wafer. (Office Action at page 9). Claim 8 of Tsuchiya recites, in pertinent part, “in said final wafer flattening stage the relative speed between the polishing pad and the wafer is quickly increased to promote chemical polishing and the applied pressure between the polishing pad and the wafer is

simultaneously quickly decreased to reduce mechanical abrasion effects.” Thus, Tsuchiya teaches *reducing mechanical abrasion by reducing pressure*. In contrast, claim 25 has been amended to clarify that the claimed process includes the step of “*facilitating the advancement of the nonaqueous liquid into contact with the semiconductor wafer by decreasing the force applied*.” Reducing mechanical abrasion effects is not the same as facilitating advancement of a liquid.

Therefore, because the prior art does not describe facilitating advancement of a liquid by reducing pressure, using the combination suggested by the Examiner would not arrive at the method claimed by the Applicant. Accordingly, a *prima facie* case of obviousness has not been made with respect to claim 25 and the Examiner is respectfully requested to withdraw the rejection of claim 25.

Discussion Regarding the Patentability of Claims 8 and 28

Claims 8 and 28 depend from claim 25 and include the limitations discussed above with respect to claim 25. Therefore, for at least the reasons set forth above with respect to claim 25, claims 8 and 28 are patentable over the prior art.

Discussion Regarding the Patentability of Claims 26-27

Claims 26-27 depend from claim 13 which the Examiner has determined to be patentable over the prior art. Accordingly, because claims 26-27 depend from claim 13 and incorporate all of the limitations of claim 13, claims 26-27 are patentable over the prior art.

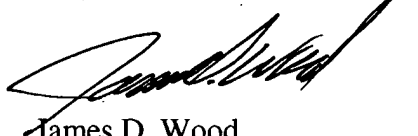
VI. New Claims

Claims 29-33 have been added. These claims depend from claim 21 and are identical to claims 7-11 with the exception of the base claim from which the claims depend. Accordingly, claims 29-33 are patentable over the prior art for at least the reasons set forth above with respect to claim 21 and no new matter is added by way of the new claims.

VII. Conclusion

For the foregoing reasons, it is respectfully submitted that applicants have made a patentable contribution to the art. Applicant respectfully requests entry of the amendment and favorable consideration of the application.

Respectfully Submitted,
Maginot, Moore & Beck LLP



James D. Wood
Attorney for Applicants
Attorney Registration No. 43,285

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Maginot, Moore & Beck LLP
Chase Tower
111 Monument Circle, Suite 3250
Indianapolis, IN 46204-5115
Telephone: (317) 638-2922